

REMARKS

The Office Action dated July 5, 2006 has been received and carefully noted. The following remarks are submitted as a full and complete response thereto. Claims 1-13 are currently pending in the application and are respectfully submitted for consideration.

Claims 1, 5-8, 12, and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Olson (U.S. Patent No. 7,050,778) in view of Feng (U.S. Patent Publication No. 2004/0002311). The Office Action took the position that Olson discloses all of the elements of the claims, with the exception of measuring the DC offset. The Office Action then cites Feng as allegedly curing this deficiency in Olson. The rejection is respectfully traversed for the reasons which follow.

Claim 1, upon which claims 2-6 are dependent, recites a method comprising filtering a signal with a bandpass filter, measuring image rejection and DC offset rejection of the filtered signal, and adjusting a center frequency of the bandpass filter.

Claim 7 recites a system comprising means for filtering a signal, means for measuring image rejection and DC offset rejection of the filtered signal, and means for adjusting a center frequency of the means for filtering.

Claim 8, upon which claims 9-13 are dependent, recites a system comprising a bandpass filter capable of filtering a received signal and capable of having a center frequency adjusted, and at least one measurement circuit, communicatively coupled to the filter, capable of measuring image rejection and DC offset rejection of the filtered signal.

Therefore, embodiments of the present invention, enable a compromise between DC offset rejection and image rejection through the use of a bandpass filter having a variable center frequency.

As will be discussed below, the cited prior art fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the advantages/features discussed above.

Olson discloses a direct conversion television tuner for processing television or cable signals. The tuner down-converts a selected channel directly from an RF frequency to an IF frequency or baseband without performing an intermediate up-conversion frequency translation. The tuner includes a pre-selected filter, an amplifier, an image reject mixer, and an IF filter. The pre-select filter receives an RF signal having multiple TV channels. The image reject mixer down-converts a selected channel to an IF frequency that is within the passband of the IF filter. Channel selection is performed by tuning the frequency of a local oscillator signal that drives the image reject mixer, and thereby tuning the channel that is translated into the passband of the IF filter.

Feng discloses a direct conversion receiver. The receiver includes a low noise amplifier, a bandpass filter, a mixer circuit, and a baseband processing assembly. The low noise amplifier is capable of receiving communication signals from an antenna, and the bandpass filter is capable of filtering the received signals to a bandpass including a reception frequency band. The mixer circuit is electrically connected to an output of the bandpass filter and can demodulate the received signals into differential signals in two

channels. The baseband processing assembly is electrically connected to the mixer circuit opposite the bandpass filter.

Applicants respectfully submit that the combination of Olson and Feng fails to disclose or suggest all of the elements of the present claims. Specifically, Olson and Feng, whether viewed individually or combined, fail to disclose or suggest “measuring image rejection,” as recited in claims 1 and 7. Similarly, the combination of Olson and Feng fails to disclose or suggest “at least one measurement circuit, communicatively coupled to the filter, capable of measuring image rejection and DC offset rejection of the filtered signal,” as recited in claim 8.

According to embodiments of the present invention, the bandpass filters 230 and 235 perform channel selection to compromise between image rejection and DC offset rejection (Specification, paragraph 0022 and Fig. 2). More specifically, according to an example of the invention, measurement circuits 285 and 290 measure the DC offset rejection and image rejection of the filtered signals and provide feedback to the bandpass filters 230 and 235 so that a new IF frequency can be chosen to form a better compromise between DC offset rejection and image rejection (Specification, paragraph 0026 and Fig. 2).

The Office Action takes the position that Olson discloses measuring image rejection. Applicants respectfully disagree. Olson merely discloses “calibration is performed by injecting a test signal at the selected channel frequency into the filter 1304, and then separately examining I/Q balance at the outputs of the filter 1304, amplifier

1306, and the image reject mixer 1310. As described herein, the maximum image rejection is achieved when there is a balanced amplitude, but a 90 degree phase shift between the I and Q channels” (Olson, Column 10, lines 39-43). As discussed above, according to an embodiment of the invention, measurement circuits 285 and 290 measure the DC offset rejection and image rejection of the filtered signals and provide feedback to the bandpass filters 230 and 235 so that a new IF frequency can be chosen to form a better compromise between DC offset rejection and image rejection. Olson fails to disclose or suggest such a configuration. As such, Olson does not disclose or suggest “measuring image rejection,” or “at least one measurement circuit, communicatively coupled to the filter, capable of measuring image rejection and DC offset rejection of the filtered signal,” as recited in the present claims.

Feng also fails to disclose or suggest this element of the claims. Accordingly, the combination of Olson and Feng fails to disclose or suggest all of the elements of claims 1, 7, and 8.

Claims 5, 6, 12 and 13 are dependent upon claims 1 and 8, respectively. Consequently, claims 5, 6, 12 and 13 should be allowed for at least their dependence upon claims 1 and 8, and for the specific limitations recited therein.

Claims 2-4 and 9-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Olson in view of Feng further in view of Vinn (U.S. Patent No. 6,441,682). The Office Action took the position that Olson and Feng disclose all of the elements of the claims, with the exception of the bandpass filter comprising two cross-coupled low pass

filters, wherein the cross-coupling includes cross-coupled variable resistors and wherein the adjusting is done by varying the resistance of the cross-coupled variable resistors. The Office Action then cites Vinn as allegedly disclosing this element of the claims. The rejection is respectfully traversed for at least the following reasons.

Olson and Feng are discussed above. Vinn discloses an active-RC polyphase band-pass filter with transconductor cross-coupling between filter sections. The polyphase filter has first to fourth inputs, first to fourth outputs, two filter sections, and a block of transconductor pairs. The four input signals succeed one another in phase by 90 degrees. The two filter sections have reactances comprised of active balanced operational amplifiers with matched capacitors in their feedback loops. The block of transconductor pairs is coupled between corresponding reactances of each filter. The transconductance of each transconductor pair is set as the product of a desired radian center frequency and the capacitance of the corresponding matched capacitors.

Applicants note that claims 2-4 and 9-11 are dependent upon claims 1 and 8, respectively. Additionally, Vinn fails to cure the deficiencies in Olson and Feng with respect to claims 1 and 8, as discussed above, since Vinn also fails to disclose or suggest “measuring image rejection,” or “at least one measurement circuit, communicatively coupled to the filter, capable of measuring image rejection and DC offset rejection of the filtered signal.” Accordingly, the combination of Olson, Feng and Vinn fails to disclose or suggest all of the elements of claims 2-4 and 9-11. Furthermore, claims 2-4 and 9-11

should be allowed for at least their dependence upon claims 1 and 8, and for the specific limitations recited therein.

Applicants respectfully submit that the cited prior art fails to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-13 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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